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PLANETARY PHENOMENA FOR NOVEMBER AND DECEMBER, 1918

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PHASES OF THE MOON, PACIFIC TIME

New Moon....Nov.	3,	1^{h}	2^{m}	P.M.	New Moon...Dec.	3,	7^{h}	19^{m}	P.M.
First Quarter.. "	11,	8	46	A.M.	First Quarter.. "	10,	6	31	P.M.
Full Moon.... "	17,	11	33	P.M.	Full Moon.... "	17,	11	17	A.M.
Last Quarter.. "	25,	2	25	A.M.	Last Quarter.. "	24,	10	31	P.M.

The Sun reaches its farthest point south of the equator, the winter solstice, on the morning of December 22nd.

The third and last eclipse of the year, *an annular eclipse of the Sun,* occurs on December 3rd. No part of it will be visible in the United States, the regions affected being almost entirely south of the equator. The path of the annulus runs from the southern Pacific Ocean across the southern part of South America and the South Atlantic, and ends on the west coast of South Africa.

Mercury is an evening star from superior conjunction on October 15th to inferior conjunction on December 18th. Greatest east elongation, 21° 30′, a medium sized greatest elongation, is reached on November 29th. This time of year is generally not favorable for observations of *Mercury* as evening star, but during the last days of November the planet remains above the horizon an hour and one-half after sunset, and it may be seen in the evening twilight for a week or so before and after the date of greatest elongation.

Venus is still a morning star on November 1st, but is too near the Sun for naked eye view. It passes superior conjunction with the Sun and becomes an evening star on November 23rd. It will then remain an evening star until the autumn of the following year. After its conjunction with the Sun it moves away from that body rather slowly, so that it will scarcely be visible at all during December. At the end of the month it will set less than an hour after sunset.

Mars remains an evening star, setting rather more than two hours after sunset, the interval varying only about ten minutes, also being practically the same as it was during September and October. The planet is gradually approaching conjunction with the Sun and the apparent distance between the bodies is growing smaller, diminishing from 46° on November 1st to 32° on December 1st, but *Mars* moves 5° northward while the Sun moves 9° southward during the two months. The combined effect is to cause the interval between the setting of the Sun and of the planet to remain practically constant. During the two months the planet moves about 50° eastward thru the constellation *Sagittarius* into *Capricorn*. On November 13th it passes about 3° south of the fourth magnitude star *Mu Sagittarii,* the end star in the handle of "the milk dipper" group; on November 18th it is less than 1° north of *Lambda Sagittarii,* a third magnitude star, the middle star in the handle of the dipper. The planet will be a little brighter than any of the *Sagittarius* stars and will be easily distinguishable by its ruddy color. *Mars* has nearly reached its minimum of brightness, but will still fall off a little during the early months of 1819 as it nears conjunction with the Sun.

Jupiter is getting into good position for evening observation. On November 1st it rises shortly after 9 P. M. and on December 31st at about sunset. For some months it has been moving eastward among the stars. On November 3rd this eastward motion ceases and it begins to retrograde, or move westward, so that by the end of December it is about 5° west of its November 1st position. It is still not far, south and west, of *Castor* and *Pollux, Alpha* and *Beta Geminorum,* and during the two month's period increases its distance somewhat from these stars.

Saturn also is in better position for evening observation toward the end of the year. On November 1st it rises a little before 1 A. M. and on December 31st before 9 P. M. Its motion is slowly eastward until December 10th; it then moves slowly westward. It is in the constellation *Leo,* very near the brightest star of the constellation, *Regulus, Alpha Leonis.* On November 1st it is about 1½° west and north of the star, and is moving in a general direction toward it. By December 10th it is nearly as far east as the star and a little less than 1° north. During the rest of December the distance increases a little, the planet returning toward the west on nearly the same line as that in which it approached. *Saturn* is nearly a whole magnitude brighter than the star, which is a small first. As seen in the telescope the minor axis is less than one-fifth the major axis and is only about two-thirds as broad as it was in January.

Uranus is in the western sky in the evening, setting shortly after midnight on November 1st and at about 8:30 P. M. on December 31st. It moves rather more than 1° eastward and northward during the two months in the constellation. On December 19th it is only 2′ south of the fifth magnitude star *Mu Capricorni.* This is too near for separation by the naked eye. During the whole period the distance of the planet from the star is less than 1°.

Neptune is near *Saturn* in the constellation *Gemini.*